Monthly Newsletter for the Biosciences & Environmental Sciences Divisions (B&ESD) June 2013

Pubs and Products

Boden, T. A., Krassovski, M., and B. Yang. 2013. The AmeriFlux data activity and data system: an evolving collection of data management techniques, tools, products and services. *Geosci. Instrum. Method. Data Syst.* 2: 165-176.

Brown, S. D., Klingeman, D. M., Johnson, C. M., Clum, A., Aerts, A., Salamov, A., Sharma, A., Zane, M., Barry, K., Grigoriev, I. V., Davison, B. D., Lynd, L. R., Gilna, P., Hau, H., Hogsett, D. A., and A. C. Froehlich. 2013. Genome sequences of industrially relevant *Saccharomyces cerevisiae* strain M3707, isolated from a sample of distillers yeast and four haploid derivatives. *Genome Announc.* Available online. DOI: 10.1128/genomeA.00323-13

Brown, S., Utturkar, S., Arkin, A. P., Deutschbauer, A., Elias, D., Hazen, T. C., and R. Chakraborty. 2013. Draft genome sequence for Desulfovibrio africanus strain PCS. *Genome Announc.* Available online. DOI:10.1128/genomeA.00144-13.

Cha, M., Daehwan, C., Elkins, J. G., Guss, A. M., and J. Westpheling. 2013. Metabolic engineering of *Caldicellulosiruptor bescii* yields increased hydrogen production from lignocellulosic biomass. *Biotechnol. Biofuel.* Available online. DOI:10.1186/1754-6834-6-85

Cheng, C.-L, Perfect, E., and R. T. Mills. 2013. Forward prediction of height-averaged capillary pressure - saturation parameters using the BC-vG upscaler. *Vadose Zone J.* Available online. DOI: 10.2136/vzj2012.0174

DeAngelis, K. M., P. D'Haeseleer, D. Chivian, B. Simmons, A. P. Arkin, K. Mavromatis, S. Malfati. S. Tringe, and T. C. Hazen. 2013. Metagenomes of tropical soil-derived anaerobic switchgrass-adapted consortia with and without iron. *Stand. Gen. Sci.* 7: 382-398.

Dow, K., Berkhout, F., Preston, B. L., Klein, R. J. T., Midgley, G., Shaw, R. 2013. Limits to adaptation. *Nat. Clim. Chang.* 3: 305-307.

Dwayne Elias and Richard Hurt, Jr., have filed an official patent application for their technique, "Method for Isolating Nucleic Acids."

Jim Elkins and coauthor, Sonya Clarkson, have filed an official patent application for their invention, "Heat-stable, Fe-dependent Alcohol Dehydrogenase for Aldehyde Detoxification."

Elias Greenbaum, Miguel Rodriguez, Jr., Hairong Qi, and Xiaoling Wang have been granted a US Patent (number 8,476,062 B2) for their technique, "Biosensor Method and System Based on Feature Vector Extraction."

Hazen, T. C. 2013. Opinion: The SuperChip for microbial community structure, and function from all environments. *Microbial Biotech.* DOI 10.1111/1751-7915.12045.

Hazen, T. C., Rocha, A. M., and S. M. Techtmann. 2013. Advances in monitoring environmental microbes. *Curr. Opin. Biotech*. 24: 526-533.

Hoffman, F. M., Kumar, J., Mills, R. T., and W. W. Hargrove. 2013. Representativeness-based sampling network design for the State of Alaska. *Landscape Ecol.* Available online. DOI 10.1007/s10980-013-9902-0.

Hu, H., Lin, H., Zheng, W., Tomanicek, S. J., Johs, A., Feng, X., Elias, D. A., Liang, L., and B. Gu. 2013. Oxidation and methylation of dissolved elemental mercury by anaerobic bacteria. *Nat. Geosci.* Available online. DOI: 10.1038/NGEO1894.

Kang, S, Van Nostrand, J. D., Gough, H. L., He, Z., Hazen, T. C., Stahl, D. A., and J. Zhou. 2013. Functional gene array-based analysis of microbial communities in heavy metals contaminated lake sediments. *FEMS Microbiol. Ecol.* Available online. 10.1111/1574-6941.12152

Kataeva, I., Foston, M. B., Yang, S., Pattathil, S., Biswal, A. K., Poole, F. L., Basen, M., Rhaesa, A. M., Thomas, T. P., Azadi, P., Olman, V., Safford, T. D., Mohler, K. E., Lewis, D. L., Doeppke, C., Zeng, Y., Tschaplinski, T. J., York, W., Davis, M., Mohnen, D., Xu, Y., Ragauskas, A. J., Ding, S. Y., Kelly, R. M., Hahn, M. G., and W. W. M. Adams. 2013. Carbohydrate and lignin are simultaneously solubilized from unpretreated switchgrass by microbial action at high temperature. *Energ. Environ. Sci.* 6: 2186-219.

Kimes, N. E., Callaghan, A. V., Aktas, D. F., Sunner, J., Golding, B. T., Drozdowska, M., Hazen, T. C., Suflita, J. M., and P. J. Morris. 2013. Metagenomic analysis and metabolite profiling of deep-sea sediments from the Gulf of Mexico following the Deepwater Horizon oil spill. *Front. Microbiol.* Available online. DOI: 10.3389/fmicb.2013.00050

Langholtz, M., Downing, M., Graham, R., Baker, F., Compere, A., Griffith, W., Boeman, R., and M. Keller. 2013. Lignin-Derived Carbon Fiber as a Co-Product of Refining Cellulosic Biomass. ORNL technical manuscript 12JMM-0026. Published in conjunction with section JMM108 of the SAE International Journal of Materials and Manufacturing - Advanced Analysis, Design and Optimization of Materials, Restraints and Structures for Enhanced Automotive Safety and Weight Reduction.

McManamay, R. A. and M. S. Bevelhimer. 2013. A Holistic Framework for Environmental Flows Determination in Hydropower Contexts. ORNL/TM-2013/159.

McManamay, R. A., Bevelhimer, M. S., and S.C. Kao. 2013. Updating the US hydrologic classification: an approach to clustering and stratifying ecohydrologic data. *Ecohydrology* Available online. DOI: 10.1002/eco.1410

McManamay, R. A., Orth, D. J., Dolloff, C. A., and D.C. Mathews. 2013. Application of the ELOHA Framework to Regulated Rivers in the Upper Tennessee River Basin: A Case Study. *Environ. Manage.* 51: 1210-1235.

Jonathan Mielenz, with co-authors Amit Naskar, Tomonori Saito, Joseph Pickel, Frederick Baker, Cliff Eberle, and Robert Norris, Jr., has filed an official patent application for their invention, "Lignin-derived Thermoplastic Co-Polymers and Methods of Preparation."

Passian, A., Tetard, L., and T. Thundat. 2013. Comments on the paper "A Comprehensive Modeling and Vibration Analysis of AFM Microcantilevers Subjected to Nonlinear Tip-sample Interaction Forces." *Ultramicroscopy* Available online. DOI: 10.1016/j.ultramic.2013.03.016

Pouchard, L. C., Branstetter, M. L., Cook, R. B., Devarakonda, R., Green, J., Palanisamy, G., Alexander, P. and N. F. Noy. 2013. A linked science investigation: enhancing climate change data discovery with semantic technologies. *Earth Sci. Inform.* Available online. DOI: 10.1007/s12145-013-0118-2

Preston, B.L. 2013. Local path dependence of U.S. socioeconomic exposure to climate extremes and the vulnerability commitment. *Global Environ. Chang.* 23: 719-732.

Preston, B. L., Dow, K., and F. Berkhout. 2013. The climate adaptation frontier. *Sustainability* 5: 1011-1035.

Riccardi D., Guo, H.-B., Parks J. M., Gu, B., Summers, A. O., Miller, S. M., Liang, L., and J. C. Smith. 2013. Why mercury prefers soft ligands. *J. Phys. Chem. Lett.* 4: 2317-2322.

Ridley, C. E., Jager, H. I., Efroymson, R. A., Kwit, C., Landis, D. A., Leggett, Z. H., Miller, D. A., and C. M. Clark. 2013. Debate: Can bioenergy be produced in a sustainable manner that protects biodiversity and avoids the risk of invaders? *B. Ecol. Soc. Am.* 94: 277-290.

Sawada, D., Nishiyama, Y., Petridis, L., Parthasarathi, R., Gnanakaran, S., Forsyth, V. T., Wada, M., and P. Langan. 2013. Structure and dynamics of a complex of cellulose with EDA: insights into the action of amines on cellulose. *Cellulose* Available online. DOI: 10.1007/s10570-013-9974-7

Shen, H., Pooviah, C. R., Ziebell, A., Tschaplinski, T. J., Pattathil, S., Gjersing, E., Engle, N. L., Katahira, R., Pu, Y., Sykes, R., Chen, F., Ragauskas, A. J., Mielenz, J. R., Hahn, M. G., Davis, M., Stewart, Jr., N., and R. A. Dixon. 2013. Enhanced characteristics of genetically modified switchgrass (*Panicum virgatum* L.) for high biofuel production. *Biotechnol. Biofuel.* 5: 71.

Skerker, J. M., Leon, D., Price, M., Mar, J., Tarjan, D., Baumohl, J., Bauer, S., Ibanez, A., Mitchell, V., Wu, C., Hu, P., Hazen, T. C., and A. P. Arkin. 2013. Dissecting a complex chemical stress: chemogenomic profiling of Zymomonas mobilis in plant hydrolysates and 37 components. *Mol. Syst. Biol.* 9: 674.

Spier, C., Stringfellow, W. T., Hazen, T. C., and M. Conrad. 2013. The fate of hydrocarbons released during the 2010 MC252 oil spill in deep offshore waters. *Environ. Pollut.* 173: 224-230.

Van der Veen, D., Lo, J., Brown, S. D., Johnson, C. M., Tschaplinski, T. J., Martin, M., Engle, N. L., van den Berg, R. A., Argyros, A. D., Caiazza, N. C., Guss, A. M., and L. R. Lynd. 2013. Characterization of *Clostridium thermocellum* strains with disrupted fermentation end product pathways. *J. Ind. Microbiol. Biot.* 40: 725-734.

Venkatramanan, R., Prakash, O., Woyke, T., Chain, P., Goodwin, L., Watson, D., Brooks, S., Kostka, J., and S. Green. 2013. Genome sequences for three denitrifying bacterial strains isolated from a uranium- and nitrate-contaminated subsurface environment. *Genome Announc.* Available online. DOI: 10.1128/genomeA.00449-13

Wang, Z. W., Lee, S. H., Elkins, J. G., Li, Y., Hamilton-Brehm, S., and J. L. Morrell-Falvey. 2013. Continuous live cell imaging of cellulose attachment by microbes under anaerobic and thermophilic conditions using confocal microscopy. *J. Environ. Sci.* 25: 849-856.

Zhang, Q., Uria-Martinez, R., and B. Saulsbury. 2013. Technical and Economic Feasibility Assessment of Small Hydropower Development in the Deschutes River Basin. ORNL/TM-2013/221. Prepared for the U.S. Department of Energy Wind and Water Power Program.

Zhou, A., Baidoo, E., He, Z., Mukhopadhyay, A., Baumohl, J. K., Benke, P., Joachimiak, M. P., Xie, M., Song, R., Arkin, A. P., Hazen, T. C., Keasling, J.D., Wall, J. D., Stahl, D. A., and J. Zhou. 2013. Characterization of NaCl tolerance in Desulfovibrio vulgaris Hildenborough through experimental evolution. *ISME J*. Available online. DOI: 10.1038/ismej.2013.60

Notable Achievements

Terry Hazen was involved in the following posters presented at the American Society for Microbiology (ASM) meeting in Denver, CO, during May 18th-21st:

- Zhou, J., Y. Deng, P. Zhang, K. Xue, J. D. Van Nostrand, Y. Yang, Z. He, D. A. Stahl, T. C. Hazen, J. M. Tiedje, and A. P. Arkin. Contributed. Stochasticity, Succession and Environmental Perturbations in Fluidic Ecosystems.
- Zhang, P., R. Chakraborty, J. Van Nostrand, Z. He, D. Curtis, Y. Deng, T. C. Hazen, A. Arkin, and J. Zhou. Contributed. Diversity of Microbial Functional Communities during Long-term Cr(VI) Immobilization Stimulated with a Slow-release Substrate in the Hanford Aquifer.
- Somenahally, A. C., J. J. Mosher, R. A. Hurt, Jr., T. J. Phelps, S. D. Brown, M. Podar, A. V. Palumbo, T. C. Hazen, A. P. Arkin, and D. A. Elias. Contributed. Chromium as a Geochemical Determinant of Microbial Community Structure and Function.
- Rocha, A. M., J. L. Fortney, S. M. Techtmann, D. C. Joyner, T. L. Mehlhorn, J. Earles, K. A. Lowe, D. B. Watson, J. H. Campbell, E. Alm, M. Smith, A. P. Arkin, and T. C. Hazen. Contributed. Geochemical diversity and microbial-environmental associations of uranium-contaminated groundwater at Oak Ridge field research sites
- Bailey, K. L., J. G. Moberly, T. J. Phelps, M. Podar, S. D. Brown, Z. K. Yang, M. M. Drake, T. C. Hazen, A. P. Arkin, A. V. Palumbo, and D. A. Elias. Contributed. Transcriptomic and Proteomic Analysis of Geobacter sulfurreducens PCA and Desulfovibrio vulgaris Hildenborough Co-cultures.
- Hemme, C. L., Q. Tu, Z. Shi, Y. Qin, J. D. Van Nostrand, L. Wu, Z. He, M. W. Fields, T. C. Hazen, J. M. Tiedje, and J. Zhou. Contributed. Metagenomic Analysis of Pristine Groundwater Suggests Robust Community Capable of Efficient Geochemical Cycling.
- Yilmaz, S., Y. K. Light, R. J. Meagher, T. C. Hazen, A. P. Arkin, and A. K. Singh. Contributed. Single-cell Analysis Platforms for Uncultivable Microorganisms.

- Techtmann, S. M, J. L. Fortney, D. C. Joyner, A. M. Rocha, T. D. Linley, and T. C. Hazen. Contributed. Hydrocarbon Degrading Bacteria in the Warm Oligotrophic Deep Eastern Mediterranean.
- Huang, J., A. Pettenato, M. Schicklberger, A. M. Deutschbauer, A. M. Rocha, D. B. Watson, T. C. Hazen, A. P. Arkin, and R. Chakraborty. Contributed. Physiology Of Nitrate-reducing Anaerobes Isolated From Background And Nitrate-contaminated Groundwater At Oakridge FRC.
- Bowen De Leon, D. B., B. D. Ramsay, D. R. Newcomer, B. Faybishenko, T. C. Hazen, and M. W. Fields. Contributed. Injection of Nitrate as a Competing Electron Acceptor during Stimulation for Cr(VI) Reduction Alters the Microbial Population in Groundwater and Surrogate Sediments.

Terry Hazen gave the invited keynote speech "The Deepwater Horizon Oil Spill: A Systems Biology Approach to an Ecological Disaster" on May 24th in Beijing, China, at the China-US Ecopartnership meeting for Environmental Sustainability.

Terry Hazen gave the invited presentation "The Deepwater Horizon Oil Spill: A Systems Biology Approach to Oil Contaminated Beaches, Marshes, and Sediment" on May 27th in Shenyang, China, at the China-US Ecopartnership meeting for Environmental Sustainability.

Terry Hazen gave the invited presentation "A Systems Biology Approach to Biotransformation of Heavy Metals and Radionuclides in Groundwater" on May 30th at Nanjing University, Nanjing, China, at the China-US Ecopartnership meeting for Environmental Sustainability.

Terry Hazen was the invited Keynote speaker at the Institute of Soil Science, Chinese Academy of Sciences, China-US Ecopartnership meeting, "Frontiers in Environmental Research," on June 1st in Nanjing, China. He presented "The Deepwater Horizon Oil Spill: A Systems Biology Approach to Oil Contaminated Beaches, Marshes, and Sediment."

The Oak Ridge Research Park hosted two nature walks on the Oak Ridge Reservation in June. On the 2nd participants joined John Byrd of the Clinch River Environmental Studies Organization (CRESO) and Trent Jett of the Environmental Sciences Division (ESD) at the Solway Bend ponds and learned about local amphibian and reptile populations. On the 8th participants joined Larry Pounds and Paul Durr (local botanists) and Trent Jett at the East Tennessee Technology Park (ETTP) ponds to discuss wetland plant, wildflower, and native grass identification.

Melanie Mayes attended the International Union of Soil Sciences (IUSS) Global Soil Carbon Conference in Madison, WI, during June 2nd-6th.

Bob Andres attended the 9th International Carbon Dioxide Conference in Beijing, China, from June 2nd-7th. He showed the poster, "A new look at the uncertainty associated with CDIAC estimates of global carbon dioxide emissions from fossil fuel consumption" with co-author T. Boden of the Carbon Dioxide Information Analysis Center (CDIAC). Bob also was a co-author on three other presentations at the meeting.

Teresa Mathews attended the 2013 American Meteorological Society (AMS) Summer Policy Colloquium in Washington, DC, during June 2nd-11th.

Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC) Staff provided an overview to the Earth Science Data and Information System (ESDIS) DAAC Managers on ORNL DAAC's data management plans and data management training for the National Aeronautic and Space Administration (NASA) Terrestrial Ecology Program (Monday, June 3rd).

Bob Cook provided two lectures remotely on June 3rd for the Environmental Informatics Management Class at the University of New Mexico. One lecture was on Best Practices for Preparing Data to Share and Archive and the second lecture was on the requirements and functionality of the ORNL DAAC.

During June 3rd-11th Maggie Davis and Keith Kline continued to support the International Organization for Standardization (ISO) PC248 – Sustainability Criteria for Bioenergy. Davis contributed to the work on ecosystem services and Kline led the International Editing Committee that managed to get a revised Committee Draft standard distributed June 12th, achieving a milestone on schedule. Comments and voting by National Mirror Committees are due by September 11th in preparation for the next plenary meeting to be held in Stockholm Sweden (September 30th-October 4th).

On June 4th Trent Jett, Kitty McCracken, and Pat Parr attended the board meeting of the Tennessee Exotic Pest Plant Council at GroWild, a native plant nursery near Nashville, TN.

Jeff Warren was an invited speaker at the 9th International Workshop on Sap Flow, June 4th-7th in Ghent, Belgium, where he discussed soil-plant water relations associated with the Spruce and Peatland Responses Under Climatic and Environmental Change (SPRUCE) Climate Change Project.

Terry Hazen presented 3 talks in Australia:

- The Deepwater Horizon Oil Spill: A Systems Biology Approach to an Ecological Disaster. June 3rd, Harbin, China. Harbin Institute of Technology.
- The Deepwater Horizon Oil Spill: A Systems Biology Approach to an Ecological Disaster. June 5th, Sydney, Australia. Commonwealth Scientific and Industrial Research Organisation (CSIRO).
- The Deepwater Horizon Oil Spill: A Systems Biology Approach to an Ecological Disaster. June 6th, Hobart, Tasmania, Australia. CSIRO.

Mark Downing and Cliff Eberle were invited to present the "State of Technology of Lignin to Carbon Fiber" at the U.S. Department of Energy Office of Energy Efficiency and Renewable Energy (EERE) Renewable Low-Cost Carbon Fiber for Lightweight Vehicles Workshop in Detroit, MI, during June 4th-5th. This Plenary presentation outlined the basis for utilizing lignin for both structural and non-structural carbon fiber production. This workshop was held by both the Department of Energy (DOE) Bioenergy Technologies Office and Advanced Materials Office in anticipation of continued discussions about biomass to materials.

ORNL DAAC developers have been working on ingest automation tools for data set submission for archival at ORNL DAAC. Daine Wright, Harold Shanafield, Yaxing Wei and Ranjeet Devarakonda have been the primary developers. A Drupal-based questionnaire (data provider questions) has been developed and is nearing completion. The questionnaire is used for gather metadata about potential datasets to be ingested to ORNL DAAC. An underlying database table

structure has been developed to provide status of ingest and to define workflows.

Boualem Hadjerioua attended the Green House Gas Emission Measurements and Modeling workshop in Rio De Janeiro, Brazil, during June 5th-7th. He presented "Characterization of Greenhouse Gas Emissions from U.S. Hydropower Reservoirs" and "Workshop on Reservoir Hydrodynamic and Water Quality Modeling (Green House Gas [GHG] emission).

Chris Schadt has accepted an invitation to join the editorial team for *BMC Microbiology* as an Associate Editor. *BMC Microbiology* (http://www.biomedcentral.com/bmcmicrobiol/) is an open access, peer-reviewed journal that considers articles on analytical and functional studies of prokaryotic and eukaryotic microorganisms, viruses and small parasites, as well as host and therapeutic responses to them and their interaction with the environment."

On June 11th Liyuan Liang, Alex Johs and Jerry Parks were invited to give a presentation at the Friends of Oak Ridge National Laboratory (FORNL) on "The ORNL mercury research program and the story of methylation gene discovery" at the University of Tennessee Resource Center in Oak Ridge, TN. Their presentation was also highlighted by the *Knoxville News Sentinel* online at http://blogs.knoxnews.com/munger/2013/06/mercury-researchers-at-fornl.html.

The following oral presentations were given at the Soil Ecology Society Meeting in Camden, NJ, during June 11th-14th:

- Jagadamma, S., Mayes, M. A., Steinweg, J. M. Influence of substrate chemistry on organic carbon decomposition and microbial community composition.
- Steinweg, J. M., Dabbs, J., Jagadamma, S., Schadt, C. W., Mayes, M. A. Relationships between measurable soil carbon pools and microbial community composition.

Sindhu Jagadamma also served as a judge for student oral and poster presentations at the Soil Ecology Society Meeting.

Jim Elkins has been appointed to the editorial board for *Advances in Biology*.

Terry Hazen was involved in the following events and presentations at the Second International Symposium on Bioremediation and Sustainable Environmental Technologies during June 10th-13th in Jacksonville, FL:

- Techtmann, S., T. C. Hazen, and R. Prince. Invited Session Chairs. Marine Oil Spills.
- Techtmann, S., J. Fortney, A. Rocha, D. Joyner, and T. C. Hazen. Invited. Hydrocarbon-Degrading Bacteria in the Warm Oligotrophic Deep Eastern Mediterranean.

Boualem Hadjerioua attended a TVA: TV-RIX (Deep Dive) meeting in Knoxville, TN, during June 11th-12th.

Tony Palumbo, Gary Sayler, Frank Loeffler, Terry Hazen, Joe Zhuang, and Alice Layton gave systems biology workshops in Beijing at the Chinese Academy of Sciences; Shenyang at Shenyang University, and Nanjing at Nanjing University and Institute of Soil Science, Chinese Academy of Sciences.

The editors of the journal *JACS* highlighted the paper, Bilayer Thickness Mismatch Controls Domain Size in Model Membranes, by Bob Standaert (*et al.*) that appeared in the May issue. Read the original article online at http://pubs.acs.org/doi/full/10.1021/ja3113615.

On June 11th, work by Terry Hazen was highlighted on the *TennesseeTODAY* website. Read the article online at http://www.utk.edu/tntoday/2013/06/11/cen-deepwater-horizon-disaster/.

During June 11th-13th Keith Kline, Maggie Davis and Lee Lynd (Dartmouth) organized a Global Sustainable Biofuels (GSB) Workshop on Future Sustainability Research at ORNL. In attendance were 2 representatives from Imperial College London (UK), 6 representatives from various universities in Brazil (College of Agriculture of Luiz de Queiroz/University of Sao Paulo, Federal University of Itajubá, State University of Campinas, and Institute of Agronomy of Campinas, Sao Paulo), 3 from Penn State, and 1 from University of Minnesota in addition to ORNL. Ten additional participants joined from Brazil, Egypt, Kenya, and South Africa via videoconference to discuss collaborations between GSB and the New Partnership for Africa's Development (NEPAD) including projects to illustrate how sustainable bioenergy can help achieve food security and other development goals. More information is available online at http://www.ornl.gov/sci/ees/cbes/workshop.shtml.

On June 12th Mark Peterson, Terry Mathews, Scott Brooks, and Mark Bevelhimer hosted the Tennessee Department of Environment and Conservation (TDEC) and United States Geological Survey (USGS) staffs from Nashville, as well as DOE-Oak Ridge Operations (ORO) staff from Oak Ridge, for a presentation and discussion of ESD's East Fork Poplar Creek mercury research. The information was well-received and further cross-organization communication and collaboration on the complex mercury issues in Oak Ridge is expected in the future.

During June 12th-13th Jim Roberto, Maggie Davis, Keith Kline, 'Debo Oladosu, Shujiang Kang, Nagendra Singh, and Virginia Dale gave presentations to international participants in the "Global Sustainable Biofuels (GSB) Workshop on Future Sustainable Bioenergy Research" (described under international collaborations below). Workshop presentations are posted on the Center for BioEnergy Sustainability (CBES) website.

Two postdoctoral associates working with Chris Schadt, Tarah Sullivan and Meg Steinweg, have been offered and accepted Assistant Professor positions starting this fall. Tarah will be moving in October to Washington State University in Pullman (http://css.wsu.edu/) to start a position in the Department of Crop and Soil Sciences. Meg will be moving in August to the University of Wisconsin in Baraboo (http://www.uwc.edu/depts/biological-sciences) to start a position in the Department of Biological Sciences.

Melanie Mayes attended 18th Annual Community Earth System Model (CESM) Workshop in Breckenridge, CO, during June 17th-20th.

Kevin Stewart went to Southport, NC, to do a Brunswick Flood Walkdown Audit site visit during June 17th-21st.

On June 19th Esther Parish and Virginia Dale were interviewed on film about bioenergy sustainability by Bruce Burkhardt of the new Public Broadcasting Station (PBS) series, "This American Land." The interview segments may appear on an episode about biofuels expected to air in fall 2013.

The Young Evolving Scientists Seminar Series (YESSS) held its monthly meeting on June 20th. The meeting featured a career development panel discussion with Biosciences Division (BSD)/ESD postdocs who have successfully landed academic positions for the fall. Thanks to Meg Steinweg, Tarah Sullivan-Guest and Beth Herndon for talking to the group! YESSS also hosted a successful coffee break networking event on June 28th to welcome new researchers and say farewell to members who will be departing at the end of the summer.
YESSS is a professional support group for early career science professionals (at all levels) within BESD research programs. The meetings are held the 3rd Thursday of each month at noon in Building 1505, Room 189. Please visit the YESSS website for more information and to join the email list: http://youngevolvingscientists.blogspot.com.

During June 20th-21st Jerry Tuskan was an invited speaker at the Energy Efficiency and Renewable Energy (EERE) Symbiosis Conference: Expanding Commercialization of Mutualistic Microbes to Increase Bioenergy Crop Production – 2, at Cornell University in Ithaca, NY. The title of the talk was “Fungal diversity within the Populus rhizoshpere and endosphere.”

On June 21st Virginia Dale presented “Environmental and Socioeconomic Indicators for Sustainability of Energy Innovation” at the Association for Environmental Studies and Sciences (AESS) conference in the session on "Energy Poverty, Disruption and Scarcity" in Pittsburg, PA.

Richard Mills presented a talk, "Identification and Visualization of Dominant Patterns and Anomalies in Remotely Sensed Vegetation Phenology Using a Parallel Tool for Principal Components Analysis" at the Fourth Workshop on Data Mining in Earth System Science (DMESS 2013) of the 2013 International Conference on Computational Science (ICCS 2013) in Barcelona, Spain. A peer-reviewed paper of the same title has appeared in the conference proceedings (DOI: 10.1016/j.procs.2013.05.411) in Elsevier's *Procedia Computer Science*.

ORNL DAAC Manager, Suresh K. SanthanaVannan, attended the Browse Imagery, Visualization, Data Discovery Technical Interchange Meeting, during June 24th-25th in Hampton, VA.

During June 24th-26th Brennan Smith and Jay Gulledge met with DOE Water Power Technical Lead Mike Reed in Washington, DC, to discuss ORNL’s support of the DOE Water Power Program. DOE acknowledged ORNL’s leadership role among labs and its unique mix of staff with hydropower and utility industry expertise and hydrologic science capability. Brennan and Jay emphasized ORNL’s commitment to continue to provide depth of knowledge and broad engagement in U.S. hydropower research and development for DOE.

On June 25th Laurence Eaton presented Bioenergy Knowledge discovery Framework (KDF) at the Woody Biomass Utilization Group Meeting/Webinar in Washington, D.C

From June 25th- July 4th Melanie Mayes was invited to Shenyang Agricultural University (SAU) for a joint meeting of the China-US Joint Research Center for Ecosystem and Environmental Change (JRCEEC). The JRCEEC is an effort between the University of Tennessee (UT), Oak Ridge National Laboratory (ORNL) and the Chinese Academy of Sciences (CAS) to address the combined effects of climate change and human activities on regional and global ecosystems and explore technologies for restoration of degraded environments. The meeting focused on collaborative efforts in the biogeochemistry of soil carbon and the effects of global change on

agroecosystems. She visited several facilities operated by SAU and CAS, including the National Field Research Station of Shenyang Agrosystems in Liaoning, the South China Botanical Garden in Guangzhou, and the Heshan Hilly Land Interdisciplinary Experimental Station in Guangzhou.

During June 25th-28th Virginia Dale and Richard Mills attended a workshop at The Socio-Ecological SYNthesis Center) in Annapolis, Maryland (http://www.sesync.org), on "Using Human Interactions with Games to Value Ecosystem Services."

Jerry Tuskan is a member of the Science Advisory Board for the European Development of improved perennial non-food biomass and bioproduct crops for water stressed environments (WATBIO) project led by the University of South Hampton. Jerry will attend the First Annual meeting of the WATBIO project and provide input on the project's goals, progress and milestones. The meeting will be held in Florence, Italy, on October 1st-2nd. The overall objective of WATBIO is to enable increased breeding efficiency and genetic optimization for drought tolerance in three specialized biomass crops: poplar, miscanthus and arundo. The research aims to improve these three specialized biomass crops by linking breeders to advanced molecular genetics using next generation sequencing approaches and molecular phenotyping. There are seven research teams; two teams are focused on education and dissemination. The WATBIO project is supported by partners from eight European countries: The United Kingdom, Sweden, Italy, Germany, France, Spain, Greece and The Netherlands. There are 22 partner universities and/or research institutions: University of South Hampton, Swedish University of Agricultural Sciences, IGA Technology, Lancaster University, University of Goettingen, University of Bolognia, Alasia, INRA, University of Tuscia, CNR Italy, TU Munich, University of Balaeric Islands, CNRS, INRA Transfert, University of Crete, Swetree Technologies, Aberystwyth University, Geneticlab, ZIM Plant Technology, Wageningen Univeristy, Donal Murphy-Brokern and Kai-Uwe Schwarz.

As part of the *ForWarn* team (including ORNL researchers Forrest Hoffman of the Computer Science and Mathematics Division [CSMD] and Jitendra Kumar of ESD), Richard Mills won the NASA Group Achievement Award.

During June 27th-28th Laurence Eaton hosted a group of agronomists from the Sun Grant Regional Feedstock Partnership Sorghum team.

The French "Laboratoire d'Excellence (Labex) ARBRE" program has granted Jessy Labbé the Visiting Scientists Award 2013. In the framework of its research within the DOE Scientific Focus (SFA) Area project Plant Microbe Interfaces (PMI), Jessy responded to the R&D fund call seeking a high-quality project addressing the "Labex ARBRE" program's collaborative priorities with the U.S. DOE. This project designed and written by J. Labbé has been defended in France by Dr. Francois Le Tacon. All research and visiting charges will be supported by the "Labex ARBRE" program.
In June Jessy visited the INRA - Nancy research centre in France for a month and to provide expertise of the Plant Systems Biology group in the *Populus-Laccaria* model. Part of the work conducted consists of analyzing the degree of polymorphism of the symbiotic regulated genes of *Laccaria* using the *Laccaria* pangenome data set. This collaboration also provided 1) phenotyping data to implement Quantitative Trait Loci (QTLs) analyses in the fungus *Laccaria* and computing tools for modeling network of mutualistic interactions, and 2) RNA sequencing data and biological material for proteome analyses which are conducted at ORNL within the PMI project.

BESD New Arrivals

ESD's Aquatic Ecology Laboratory is busy this summer with a number of new people joining the ORNL Aquatics team. Sridhar Bhaskar, Visiting Faculty from Texas Southern University, will be assisting Lower East Fork Poplar Creek (LEFPC) mercury team develop a comprehensive understanding of spatial dynamics of mercury loading and distribution in the LEFPC watershed. Chris DeRolph, Post-Master's Research Associate, will be supporting ESD's long-term study on hydro-related environmental mitigation technologies, hydropower generation and efficiency assessment, hydro project cost data collection, and cost modeling. Students and guests working in the lab this summer are Jordan Chaney, Angelina Haines, Constantin Scherelis, Jesse Morris, Sally Ross, George Southworth, and Matthew Vick.

Chris DeRolph arrived in June to work as a post-masters research associate to work under the advising of Mark Bevelhimer. He will be working on the National Hydropower Asset Assessment Program (NHAAP) project and other projects addressing environmental issues associated with conventional hydropower development.

During June through August Laurence Eaton is hosting 2 summer students: Sharon Smith from Walters State community college who will be collecting data for the Sun Grant Initiative Regional Feedstock Partnerships field, and Justin Judy from Bluegrass Community & Technical College who will analyze ORNL's Biomass library of field trial and agricultural statistics to access the challenges facing growers and biomass facilities from extreme weather events.

During June through August Latha Baskaran is hosting Josh Monroe from the University of Tennessee who will help study the response of aquatic species to land-use change in the Tennessee River Basin.

Zachariah Seiden (graduate student from the University of Tennessee) is working with Latha Baskaran, Esther Parish and Virginia Dale to adapt Soil and Water Assessment Tool (SWAT) to examine effects of conversion of land use from hay/pasture to switchgrass on water quality.